breadth of the black rings, but broadening in the centre below, where they may equal or exceed in breadth the black interspaces.

Skull markedly smaller than in *G. servalina*, the brain-case large and well rounded, but the face small and light. Bullæ very small and low, lower than in any other Genet. Opening of posterior nares broadly rounded, its centre more than 3 millim. behind the bony supports of the molars. Teeth throughout small and delicate.

Dimensions of the type (measured in skin) :—

Head and body 500 millim.; tail 380; ear (dry) 31.

Skull: greatest length 83; basal length 77; zygomatic breadth 40; nasals $13{\cdot}5 \times 6{\cdot}2$; interorbital breadth 12; breadth of brain-case 29·5; palate length 39; length of bullæ (including thickness of paroccipital processes) 16·5. Greatest diameter of p^4 8·6, outer diameter of p^4 7·2; transverse diameter of m^1 6·3; length of p_4 6·4, of m_1 6.

Hab. Lagari, Mau district, south of El Burgon Range, British East Africa. Altitude 7600 feet.

Type. Adult female. B.M. no. 2. 2. 6. 1. Collected 17th July, 1901, and presented by C. S. Betton, Esq.

The far smaller skull and different coloration will readily distinguish this species from *G. servalina*, to which alone it appears to be allied.

LXII.—*Further Notes on the* Pangoninæ *of the Family* Tabanidæ *in the British Museum Collection.* By Miss Gertrude Ricardo.

[Continued from vol. viii. p. 315.]

Chrysops, Meigen.

Ethiopian Region.

Loew, in his 'Diptera Südafrik.' (1860), should be consulted for the species from this region. There are eleven described species, all from South, West, or East Africa, and three new ones are described here for the first time, the types being in the British Museum collection. I append a list of the species, no separate catalogue having yet been published of the African species.

**C. longicornis*, ♀, Macq., Dipt. Exot. i. (1) p. 156, pl. xix. fig. 2 (1838); Gerst., Archiv f. Naturgesch. xxxvii. p. 362 (1871); Walker, List Dipt. pt. v. Suppl. 1, p. 290 (1854); Gerst., Decken's Reise in Ost-Afrik. p. 385 (1873).—S., W., & E. Africa.

C. obliquefasciatus, ♀, Macq., Dipt. Exot. i. (1) p. 157 (1838); Walker, List Dipt. pt. i. p. 195 (1848); id. ibid. pt. v. Suppl. 1, p. 289 (1854); Loew, Dipt. Südafrik. p. 30 (1860).—Cape of Good Hope.

C. natalis, ♀, Macq., Dipt. Exot. Suppl. 1, p. 43, pl. iv. fig. 13 (1846); Walker, List Dipt. pt. v. Suppl. 1, p. 290 (1854).—Port Natal.

**C. tarsalis*, ♀, Walker, List Dipt. pt. i. p. 200 (1848).—Sierra Leone.

**C. calidus*, ♂, Walker, List Dipt. pt. i. p. 205 (1848).—South Africa.

C. ciliaris, ♀, Loew, Dipt. Südafrik. p. 28, pl. i. fig. 14 (not 17) (1860).—Kaffraria.

C. laniger, ♂ ♀, Loew, Dipt. Südafrik. p. 28 (1860).—Cape of Good Hope.

**C. confluens*, ♀, Loew, Dipt. Südafrik. p. 30, pl. i. fig. 19 (1860).—Cape of Good Hope.

**C. stigmaticalis*, ♀, Loew, Dipt. Südafrik. p. 28, pl. i. fig. 18 (1860); Johnson, Proc. Ac. Nat. Sci. Philad. p. 157 (1898); Ricardo, Ann. & Mag. N. H. (7) vi. p. 163 (1900).—Pretoria, Kaffraria, Somaliland.

C. dimidiatus, ♀, Wulp, Notes Leyden Museum, vii. p. 80 (1885).—S.W. Africa.

C. trimaculatus, ♀, Bigot, Mém. Soc. Zool. Fr. v. p. 607 (1892).—Senegal.

**C. fuscus*, ♀, sp. n.

**C. madagascarensis*, ♀, sp. n.

**C. fuscipennis*, ♀, sp. n.

1.	Wings with a distinct transverse band and apical spot	2.
	Wings with no distinct transverse band or apical spot	12.
2.	Wings with clear spots in the fourth and fifth posterior cells	3.
	Wings with no such clear spots	6.
3.	Hairs on sides of thorax and breast yellow	4.
	Hairs on sides of thorax and breast black.	5.
4.	Hind border of wings grey. Legs reddish yellow and black	*stigmaticalis*, ♀, Loew.
	Hind border of wings brownish. Legs yellow, the tarsi darker	*confluens*, ♀, Loew.
	Posterior borders of abdominal segments bordered with white	*obliquefasciatus*, ♀, Macq.
	Wings on the posterior basal border dusky. Legs red	*natalis*, ♀, Macq.
5.	Legs black and red	*fuscus*, ♀, sp. n.
6.	Tibiæ black	7.
	Tibiæ yellowish or brown	10.
7.	Abdomen black	8.
	Abdomen not wholly black	9.
8.	First joint of antennæ not incrassated. Legs black and yellow	*tarsalis*, ♀, Walker.
	First joint of antennæ incrassated. Legs black	*madagascarensis*, ♀, sp. n.
9.	Abdomen black, with yellow markings	*trimaculatus*, ♀, Bigot.
	Abdomen reddish yellow, with white pubescence	*laniger*, ♂ ♀, Loew.
10.	Abdomen yellowish	*longicornis*, ♀, Macq.
	Abdomen yellow, with black bands	11.

11.	Antennæ yellowish. Bands of abdomen entire	*fuscipennis*, ♀, sp. n.
	Antennæ black. Bands of abdomen divided in the middle. Fore tibiæ blackish	*ciliaris*, ♀, Loew.
12.	Abdomen with one black central stripe	*calidus*, ♂, Walker.
	Abdomen with two black stripes	*dimidiatus*, ♀, Wulp.

Loew has a note to the effect that his species *C. confluens* is nearly allied to *C. obliquefasciatus*, Macq. (Dipt. Südafrik. p. 30). The colour of the hairs on the sides of the thorax is not mentioned in Macquart's description of *C. natalis*; I have assumed they are yellow, and placed it accordingly in the table.

Chrysops longicornis, ♀, Macq.

Two females from Port Natal (*Gueinzius*) and Natal (*Saunders*).

Chrysops tarsalis, ♀, Walker.

Type (female) from Sierra Leone (*Morgan*), and another female (*Clements*).

This species is *not* identical with *C. longicornis*, Macq., as suggested by Gerstäcker in Decken's 'Reise in Ost-Afrik.' p. 385.

For *with* in Walker's description read *Wings*.

Chrysops calidus, ♂ ♀, Walker.

Type (male and female) from S. Africa, 48. 70.

Chrysops stigmaticalis, ♀, Loew.

One female from Pretoria (*W. L. D.*), three from Salisbury, Mashonaland, Nov. 1899 (*Marshall*).

Chrysops confluens, ♀, Loew.

One female from interior S. Africa, 43. 19 (Lord Derby Coll.); one from S. Africa, 44. 6 (*Dr. Smith*); one from George, Cape Colony, 80. 46 (*Wilson*).

Chrysops fuscus, ♀, sp. n.

Type (female) and four females from Salisbury, Mashonaland, Oct. 1899 (*Marshall*); two from Estcourt, Natal, Sept. 96 (*Marshall*); one from Delagoa Bay, 86. 20.

Black, with black hairs on sides of thorax.

Legs black, with the middle and posterior metatarsi red and the middle tibiæ reddish.

Face shining black, with black pubescence and white tomentum at the sides and in the centre; the facial tubercles are oblong; forehead black, with black pubescence and some yellow hairs on the vertex. Antennæ black, the three joints about equal in length, the first two with black hairs. Palpi black. Thorax with dirty white pubescence and brownish tomentum, the breast-sides with black pubescence. Abdomen with black pubescence and some pale brownish tomentum, which gives it in some lights a pale brownish appearance. Legs black, the middle tibiæ faint reddish, the middle and posterior metatarsi red; on the coxæ and posterior femora are scanty long white hairs, elsewhere the pubescence is black. Wings are very similar to those of *C. stigmaticalis* (Loew, Dipt. Südafrik. pl. ii. fig. 19), but the dark colouring extends further up from the base, through the two basal cells, leaving only a narrow clear band between it and the transverse band.

Length 8 millim.

In some of the specimens the light colour of the legs is more pronounced. The species is related to *C. stigmaticalis*, Loew, but is smaller and slighter, and easily distinguished from it by the absence of the golden yellow hairs on sides of thorax.

Chrysops madagascarensis, ♀, sp. n.

Type (female), and another female from Ambohimibombo Forest, Madagascar, 98. 46 (*Forsyth Major*).

Wholly black. First joint of antennæ incrassated.

Face with shining black oblong tubercles, which join in the middle and extend to the mouth, not quite attaining the border of the eyes; on the forehead is one large black shining callosity extending the whole width, the vertex black, the remainder of the forehead and face covered with golden-yellow pile. Antennæ long and nearly devoid of pubescence, the first joint thickened and longer than the second, the third with the divisions of the first annulation very distinct; there are a few hairs on the sides of the second joint only. Palpi stout, club-shaped, nearly as long as the proboscis. Thorax with two narrow grey stripes and some golden pubescence on the anterior part and on the sides. Abdomen short, with vestiges of golden pubescence on the sides and on the last segment. Legs black, the posterior tarsi yellowish (in the other female this does not appear). Wings grey, the

transverse band dark brown, reaching to the anal cell; the shading at the base extends almost to the apex of the first basal cell and more than halfway up the second, so that the clear part between it and the band is narrow.

Length 7 millim.

This species is easily distinguished from *C. tarsalis*, Wlk., by the first joint of the antennæ, the wholly black legs and abdomen, and the darker wings.

Chrysops fuscipennis, ♀, sp. n.

Type (female) from Gaizima, Mashonaland, 95. 12; one other from Salisbury, Mashonaland, Dec. 44 (*Marshall*); and one, unlabelled, from unknown locality.

This species is allied to *C. ciliaris*, Loew.

Brown. Abdomen pale yellowish, with broad blackish bands, which only leave the ground-colour free on the posterior borders of the hind segments.

Face grey, with two black, shining, oblong spots on each side below the antennæ, the pubescence grey; forehead with a large central black spot reaching nearly to the eyes, rounded posteriorly and joined in the centre by a small black spot bearing one ocellus, the other two forming the base of the triangle are placed on the border of two oblong black spots which reach to the eyes on each side and are separated in the centre of the vertex; the pubescence on the forehead white. Antennæ yellow, the third joint black except at its base; the pubescence on the first two joints black, these equal in length, the third slightly longer than the second. Palpi long, yellow. Thorax black, with two grey stripes and some grey pubescence, sides grey, the shoulders yellow. Breast-sides grey. Scutellum brown, with grey tomentum. Abdomen with the first segment brown at its base, the brownish-black band on the second segment does not quite reach the side, on the posterior border of the segment the yellow ground-colour becomes greyish; there is a similar band on each segment which attains the side and entirely occupies the anterior part of the segment, only leaving a posterior border of grey colour; the short pubescence is black, with a few grey hairs intermixed, grey at the sides, except on the third segment, where it is black; the underside is yellow at the base, then brown and grey, the pubescence being grey on the light parts and black on the dark parts. Legs yellowish brown, the last four joints of the tarsi darker; there is scattered white pubescence on the coxæ and femora; the pubescence on the tibiæ and tarsi short and black, longer on the hind tibiæ. Wings clear, brown on the fore border, with a

brown transverse band only just reaching into the anal cell and not attaining the apex of the discal cell; it is very similar to that of *C. ciliaris*, Loew.

Length 8 millim.

Chrysops trimaculatus, ♀, Bigot.

Type (female) and one other female, both in bad preservation, the type on a card.

This species is distinguished by a singularly narrow forehead for a species of this genus; there is a triangular space in front, its base being the narrowest part of the forehead; the eyes approach very closely, receding a little on the vertex, leaving a small triangular space on which the ocelli are placed. For *first segment* in Bigot's description read *second segment*. So far as can be judged from the specimens, the third segment seems wholly black and the fourth almost wholly yellowish red. On the underside of the other female (not the type) the second segment is yellow, and there is some reddish-yellow colour on the third and fourth. Wings with the basal cells infuscated on their basal half; the transverse band reaches the hind border, extending to the apex of the anal cell, becoming fainter in colour in the fourth and fifth posterior cells; the apical spot is narrow, reaching to the apex of the wing.

Australian Region.

The *Chrysops subcanus* of Walker does not belong to the *Chrysops* genus (see Ann. & Mag. Nat. Hist. (7) viii. p. 287, 1901), which leaves only two species as yet described from this region, viz. :—

C. testaceus, ♀, Macq., Dipt. Exot. Suppl. 4, p. 38 (1850).—Tasmania.
C. albicinctus, ♀, Wulp, Tijd. v. Ent. xi. p. 103, pl. iii. fig. 6 (1868); id. Cat. Dipt. S. Asia, p. 66 (1896); Ost. Sack, Ann. Mus. Civ. Gen. xvi. p. 418 (1880); Bigot, Cat. Orient. Dipt. p. 265 (1891).—Salawatti and New Guinea.

1. Wings with dark transverse band and an apical spot	2.
2. Abdomen black, the second segment with a narrow white band	*albicinctus*, ♀, Wulp.
Abdomen testaceous brown, with yellow spots.	*testaceus*, ♀, Macq.

C. cœcutiens, L., is said by Macquart to have been found in Australia (Dipt. Exot. Suppl. 4, p. 40, 1850).

Oriental Region.

The described species from this region included in Van der Wulp's 'Catalogue of the Diptera of S. Asia,' 1896, number twenty. Of these *C. parallelus*, Walker (Proc. Linn. Soc. v. p. 276, 1861), does not belong to the genus *Chrysops*; *C. ligatus* and *C. terminalis*, Walker (List Dipt. pt. i. p. 195, 1848), are synonyms of *C. dispar*, Fabr. *C. albicinctus*, Wulp (Tijd. v. Ent. xi. p. 103, 1868), from New Guinea and Salawatti, is now included among the species from the Australian Region. *C. translucens*, Macq., and *C. pellucidus*, Fabr., are regarded as two distinct species. *C. Mlokosiewiczi*, Bigot, and two new species are added, which makes the number still twenty. *C. alter*, Rondani (Ann. Mus. Civ. Gen. vii. p. 460, 1875), owing to the imperfect description, is not included in the synoptical table. To Wulp's Catalogue should be added :—

C. Mlokosiewiczi, ♀, Bigot, Ann. Soc. Ent. Fr. (5) x. p. 146 (1880). [*C. iranensis*, ♀, Bigot, Mém. Soc. Zool. France, v. p. 602 (1892).] —N. Persia, Caucasus.

The Walker type named *Chrysops parallelus* apparently belongs to the Tabaninæ, as no spurs seem present on the hind tibiæ; it should belong to the genus *Diachlorus*, where it is placed for the present, but the fore tibiæ being straight, not dilated, makes it doubtful whether it should remain there; only one species of this genus is as yet recorded from the Oriental Region. The antennæ (now broken off) have the first joint long, the second very short, discous in shape, the third as long or longer than the first, with five annulations, the first of these as long as the other four together and indistinctly marked with four divisions; they are yellow in colour, darker on the third joint.

A specimen marked *C. cribrata*, Wlk., from Java, evidently only a manuscript species, is not a *Chrysops*, but a *Hæmatopota*.

1.	Wings with a dark transverse band and an apical spot	2.
	Wings with a dark transverse band, but no apical spot	15.
2.	Wings with a hyaline sinus on the posterior border of the band	3.
	Wings without a hyaline sinus on the posterior border of the band	10.
3.	Abdomen yellow, livid at its base	*semicirculus*, ♀, Wlk.
	Abdomen yellow, with black longitudinal stripes	4.

	Abdomen yellow or white, with some segments black	6.
	Abdomen black, with the first or the second segment, or both, white or yellow.	7.
4.	Abdomen with a black bifid stripe on the second segment, often extending to the third or fourth segment	5.
	Abdomen with four black stripes	*striatus*, ♂ ♀, Wulp. / *Mlokosiewiczi*, ♀, Bigot.
5.	Antennæ reddish	*dispar*, ♂ ♀, Fabr.
	Antennæ blackish	*bifasciatus*, ♀, Macq.
6.	Abdomen pale yellow, with a black spot on the second segment, and the last segment black	*flaviventris*, ♀, Macq.
	Abdomen whitish, with the anterior part of the first segment black and a black spot on the second segment	*rufitarsis*, ♂, Macq.
7.	Face and antennæ blackish	8.
	Face and antennæ yellowish	9.
8.	Abdomen with the first segment black	*pellucidus*, ♀, Fabr.
9.	Abdomen with the first segment white on the anterior half	*translucens* (? ♀), Macq.
	Abdomen with the first two segments yellow at the sides	*sinensis*, ♀, Wlk.
10.	Wings with a clear spot in the discal cell.	*stimulans*, ♂, Wlk.
	Wings without a clear spot in the discal cell	11.
11.	Abdomen with a black bifid stripe on the second segment	*indianus*, ♂ ♀, sp. n.
	Abdomen yellowish, with black bands	12.
12.	Abdomen with one black band; face yellowish	*fixissimus*, ♀, Wlk.
	Abdomen with two black bands; face blackish	13.
13.	The black bands not connected laterally	*fasciatus*, ♀, Wiedem.
	The black bands connected laterally	14.
14.	The second black band concave in the middle	*signifer*, ♂, Wlk.
	The second black band straight	*cinctus*, ♀, Bigot. / *clavicrus*, ♀, Thomson.
15.	Wings with a hyaline sinus on the posterior border of the band	16.
	Wings without a hyaline sinus on the posterior border of the band	17.
16.	Abdomen black on the basal half, with a grey band and stripe, yellow on the apical half	*manilensis*, ♀, Schiner.
	Abdomen black, with a yellowish band on the second segment	*flavocinctus*, ♀, sp. n.

The species *rufitarsis*, *bifasciatus*, and *flaviventris*, Macq., are included under those which have an apical spot, as being probably correct, though from the descriptions it is impossible to speak with certainty. *C. alter*, Rondani (Ann. Mus. Civ. Gen. vii. p. 460, 1875), is not included; the description of

the abdomen having been omitted, it is impossible to identify the species.

Chrysops dispar, ♂ ♀, Fabr., Ent. Syst., Suppl. p. 567 (1798) (*Tabanus*); id. Syst. Antl. p. 112 (1805); Wiedem., Dipt. Exot. i. p. 102 (1821); id. Auss. zweifl. Ins. i. p. 196 (1828); Macq., Dipt. Exot. i. (1) p. 159 (1838); id. ibid. Suppl. 3, p. 14 (1848); Walker, List Dipt. pt. i. p. 195 (1848); id. ibid. pt. v. Suppl. 1, p. 292 (1854); Ost. Sack., Ann. Mus. Civ. Gen. xvi. p. 418 (1880); id. Berlin. ent. Zeit. xxvi. p. 97 (1882); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65; id. Dipt. Sumatra-Exp. p. 19 (1892); Röder, Ent. Nachr. xix. p. 234 (1895).

Hæmatopota lunata, Gray, Griff. et Cuvier, Anim. Kingd. xv. p. 696, pl. cxiv. fig. 4 (1832).
Chrysops ligatus, ♀, Walker, List Dipt. pt. i. p. 195 (1848); Bigot, Cat. Orient. Dipt. p. 264 (1890); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).
Chrysops terminalis, ♀, Walker, *l. c.*
Chrysops impar, Rond. Ann. Mus. Civ. Gen. vii. p. 460 (1875).

Type of *terminalis*, ♀, Walker.

Type of *ligatus*, ♀, Walker, from Bengal, 42. 25 (*Campbell*), and other specimens from Nepaul (Hardwicke Bequest), Mysore, Ceylon (*Yerbury, Green*), Malay, Sumatra, Java, and Hong Kong.

Walker's two types are similar to the other specimens of *C. dispar*, F., in the British Museum Coll. *C. ligatus*, Wlk., is only a rather pale-coloured specimen with some lighter spaces in the wing-cells. *C. terminalis*, Wlk., is a pale-coloured specimen with the black bifid stripe not reaching beyond the second segment, as in Wiedemann's original description of *C. dispar*. The species seems rather variable, the stripe extending sometimes only to the posterior border of the second segment, but often to the third or even fourth segment. Walker identified several specimens of *C. dispar* correctly and then described his two new species, placing them directly after *C. dispar* in his Catalogue; but I can see no differences sufficiently marked to justify them being made distinct species. There is only one specimen among the series which has a darker face, as mentioned by Macquart. On one of the specimens from Ceylon Col. Yerbury has the following note :—"Common and generally distributed. Torments cattle. The scutellum and the pilose stripe on the pleuræ in life bright gamboge-yellow."

Chrysops fasciatus, ♀, Wiedem., Dipt. Exot. i. p. 103 (1821); id. Auss. zweifl. Ins. i. p. 198 (1828); Walker, List Dipt. pt. i. p. 193 (1848); id. ib. pt. v. Suppl. 1, p. 291 (1854); Dol. Nat. Tijdschr. Ned. Ind. xvii. p. 84 (1858); id. Journ. Proc. Linn. Soc. i. p. 112 (1857); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

One male from uncertain locality.

One female from Celebes.

These two specimens have the facial tubercle shining black and two distinct black bands on the posterior borders of the second and third segments, not attaining the sides and not joined. Wiedemann gives the band of the wing as hardly incised posteriorly. I have included it under those species with no hyaline sinus, as the colouring only becomes fainter on the posterior border and does not amount to a sinus.

Chrysops translucens, ♀, Macq., Dipt. Exot. i. (1) p. 158 (1838); Walker, List Dipt. pt. v. Suppl. 1, p. 291 (1854); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

There are no specimens of this species in the British Museum Collection, but there were two females sent me by Dr. Kertesz, of Budapest, from Borneo, for identification, which I think belong to this species. There is also a very poor specimen of what I believe to be *C. pellucidus*, F., in the British Museum Collection. From the examination of these, together with the descriptions, it seems probable that *pellucidus* and *translucens* are both distinct species, the latter not being a variety of the former, as suggested by Macquart. His species is distinguished from *pellucidus* by the almost wholly yellow first segment of the abdomen, there being only a narrow black band on its posterior border, whereas the Fabrician species is said to have the first segment wholly black; the second segment in *translucens* is yellow, with a central black spot, and a yellow spot in the centre of this last continued into the third segment; of this there is no mention in the description of *C. pellucidus*: the face in *C. translucens* is brownish, with a yellow central stripe; in *C. pellucidus* it is apparently shining black.

Chrysops semicirculus, ♀, Walker, List Dipt. pt. i. p. 196 (1848); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

Type (female) from the East Indies.

It is in too poor preservation to make it possible to supplement the original description.

Chrysops stimulans, ♂, Walker, Dipt. Saund. pt. i. p. 73 (1850); id. List Dipt. pt. v. Suppl. 1, p. 289 (1854); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

Type (male) from East India, 54. 13 (Saunders Coll.).

One male from the Persian Gulf, 91. 84 (*Cumming*), which seems identical, though the clear spot in the apex of the wing is of a different shape.

Chrysops fixissimus, ♀, Walker, Journ. Proc. Linn. Soc. i. p. 112 (1857); Bigot, Cat. Orient. Dipt. (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

Chrysops unizonatus, ♀, Rond. Ann. Mus. Civ. Gen. vii. p. 459 (1873); Osten Sacken, Berlin. ent. Zeit. xxvi. p. 97 (1882).

The type is not to be found in the British Museum Collection, but only the variety. Col. Yerbury has a note on one of the specimens to the effect that the species is "*Rare.*"

Type (var., female) from Sarawak, 68. 4 (*Saunders*).

Two from Sandakan, Brit. N. Borneo, 98. 38 (*D. Cator*), and one, ditto, 95. 134; one from Singapore, 96. 114 (*Flower*); one from Sarawak, 56. 14 (*Saunders*); two from Trincomalee, 2. 10. 90—10. 9. 91 (*Yerbury*).

Walker describes the var. "with two bands, one black, the other brown." I should rather describe it as having one black band only, on the posterior border of the second segment. It is related to *C. fasciatus*, but distinguished from it by the facial tubercle being yellowish brown, becoming black only at its upper corners, and by the absence of a second band on the abdomen; the third segment has sometimes traces of black colour. The species described by Rondani as *C. unizonatus* is a synonym of this, and not of *C. signifer*, Walker, as suggested by Osten Sacken, who states that the face in the Rondani species is yellow, which agrees with the colouring of the face of this species (see Osten Sacken, in Berlin. ent. Zeit. xxvi. p. 97).

Chrysops signifer, ♂, Walker, Journ. Proc. Linn. Soc. v. p. 276 (1861); Osten Sacken, Berlin. ent. Zeit. xxvi. p. 97 (1882); Bigot, Cat. Orient. Dipt. p. 265 (1891); Wulp, Cat. Dipt. S. Asia, p. 65 (1896).

Type (male) from Batchian.

This is a distinct species from the above and from *C. fasciatus*, having the second black band on the second segment extending to the sides and continuing upwards, thus joining the first band, so that a wide triangular space of the yellow colour is left between the two bands. The face is shining black, with a very short yellow stripe in the centre.

Chrysops sinensis, ♂ ♀, Walker, Dipt. Saund. p. 453 (1854); Wulp, Cat. Dipt. S. Asia (1896).

The type (a female) is merely labelled "China"; there is also a male specimen from Haining, Chekiang, China, 93. 52 (*Walker*).

Neither of the specimens is in good preservation; in their general appearance they have more resemblance to the species of the Palæarctic Region, but do not seem identical with any of the described species, so that they are included among those of the Oriental Region for the present.

♀. Black. Face and antennæ yellowish.

Face yellowish; the callosities which reach to the proboscis are tawny; the cheeks black, covered with yellow tomentum, leaving only a round black shining spot apparent on the border of the eyes. Palpi yellow. Antennæ yellow; the third joint is wanting (Walker says it is black at the tip). Forehead yellowish, with the usual black tubercles. Thorax black (probably denuded of grey stripes). Abdomen black, the first segment yellow at the sides; the second yellow, with a black spot (shape indistinguishable) in the centre; the third, fourth, and fifth segments black, with yellow posterior borders, which attain in the centre to triangular spots; there is a trace of a yellow spot on the sides of the third segment; the pubescence seems chiefly yellow. Legs yellow, knees darker. Wings with the usual band and apical spot; the shape of the former is somewhat peculiar, projecting on its outer border towards, but not attaining, the fork of the third vein; in the first posterior cell it becomes concave, then slightly convex till it reaches the fifth posterior cell, where the sinus is not very marked, and follows the fifth vein; it is narrow in width, only filling the discal cell, not encroaching on the basal cells at all, and filling the fourth posterior about halfway up; the basal cells have only dark shading at their extreme base; the apical spot is the same width throughout, only crossing the anterior branch of the third vein at its apex.

In the male the upper half of the facets of the eyes is larger and there is a well-marked dark band across and an

oblong spot. The thorax has a greyish-brown central stripe and grey lateral stripes. The black marks on the second segment consist of two oblong spots converging on the anterior border and reaching the hind border; the wings are similar to those of the female.

Chrysops Mlokosiewiczi, ♀, Bigot, Ann. Soc. Ent. Fr. (5) x. p. 146 (1880).

C. iranensis, ♀, Bigot, Mém. Soc. Zool. France, v. p. 602 (1891).

Among the types kindly lent me by Mr. Verrall there is one (? female) specimen with the head wanting, labelled as above and from the Caucasus, but the specific name is crossed out and "*iranensis*" scribbled underneath; there is another female specimen only labelled "N. Persia." Bigot described one female as *C. Mlokosiewiczi*, from N. Persia or Caucasus, and later two females from N. Persia as *C. iranensis*; apparently he concluded finally that all were one species, which certainly seems likely judging from the descriptions: in this case the name *Mlokosiewiczi* would have priority; it seems nearly related, if not identical, with a species described by Wulp from Amoy, China, and named by him *C. striatus*. On comparison of the two specimens of his species in the British Museum Collection with the Bigot specimens, the only difference to be seen is the colour of the tubercle above the antennæ, which is nearly wholly reddish in the specimen from N. Persia, not shining black, as Wulp describes; they are exactly similar in the wing; the headless specimen has the colouring of the abdomen more greyish than ochraceous, as in *C. striatus*. Considering the distance between the localities, it is perhaps preferable to keep the species apart for the present, placing, however, the Bigot species among those of the Oriental Region.

Chrysops cinctus, ♀, Bigot, Mém. Soc. Zool. Fr. v. p. 602 (1892); Wulp, Cat. Dipt. S. Asia, p. 66 (1896).

? *Chrysops clavicrus*, Thomson, Eugen. Resa, p. 452 (1868).

I have examined the type (female) from the Philippines lent me by Mr. Verrall; it is darker than the three other species with black bands, and the yellow colour of the abdomen is not diaphanous; it is nearly allied to *C. fasciatus*, Wiedem., and *C. signifer*, Wlk., but the abdomen is darker and the black bands broader.

I believe it to be the same as *C. clavicrus*, Thomson, from Malacca; and if this proves to be correct, Bigot's name must be sunk.

The original description may be amended thus :—

Face black, yellow at the sides, and with a central short yellow stripe. Abdomen with the first segment pale yellow and a narrow black posterior border; the second is pale yellow on its anterior border; the black band posteriorly is nearly equal in width to the yellow colour; the third segment is almost wholly black, with only a narrow yellow border anteriorly; the two black bands join at the sides, but the second band is entirely straight on its posterior border, thus differing from *C. signifer*, Wlk., which is deeply indented in the centre; the fourth, fifth, sixth, and seventh segments are reddish yellow, with obscure black square spots in the centre of the fourth and fifth. The wings are clear, dark at the base and along the fore border to the apex, and with the usual transverse band which extends to the posterior border.

Chrysops striatus, ♂ ♀, Wulp, Notes Leyden Museum, vii. p. 79 (1885); id. Cat. Dipt. S. Asia, p. 66 (1896).

One male and one female from Tygosan, Chusan Archipelago, 92. 196 (*Walker*).

Chrysops indianus, ♂ ♀, sp. n.

One male from Nilghiri Hills, 88. 112 (*Hampson*).

One female from Khasi Hills district, India, 96. 135 (*Chennell*, 1878).

A species allied to *C. dispar*, Fabr., but in the wing approaching *C. fasciatus*, Wiedem.; it is larger and more robust than *C. dispar*, Fabr.

Yellow, with a black bifid stripe on the second segment, enclosing a small, almost round, yellow spot, but the black does not join on the posterior border.

♂ & ♀ (types). Face yellow, with yellow hairs on the central stripe and at the sides. Antennæ long and slender, nearly equal in length to the head and thorax, all the joints about equal in length; yellow, the third joint darker, the first clothed with long black hairs, the second with shorter ones, the third bare. Palpi yellow. Thorax and scutellum brownish, with yellow pubescence, thicker at the sides, the breast the same colour. Abdomen light yellow, the second segment paler; the first segment with a narrow black band on the posterior border, the second with a black stripe which begins in the centre and then divides, sending out a branch on each side reaching to the hind border, and there extending outwards till it ends in a point; a small, yellow, oblong spot is thus left in the middle, surrounded by the black, excepting

on its posterior border; the black stripes are continued very faintly on the third segment; the sides of abdomen have short black pubescence; the underside yellow, with three faint brown stripes on the third segment. Legs yellowish brown, with short black pubescence; the tibiæ dilated, especially the anterior and middle pairs. Wings clear, with brown colouring at the extreme base only filling the basal cells one third of their length, continued along the fore border to the apex, and as a transverse band which attains the posterior border just contiguous to the anal cell; it is a little fainter in colouring in the fifth posterior cell; its apical border is straight, also the inner one as far as the anal cell.

Length 11½ millim.

The female is identical.

Chrysops flavocinctus, ♀, sp. n.

Type (female) and another female from Khasi Hills, Assam, 97. 82 (*Heyne*); two females from North Khasi Hills, Lower Ranges, 96. 135 (1878, *Chennell*); one female from Sarawak, 56. 44 (*Wallace*); one female from Trincomalee, 54 (*Yerbury*).

Black. Abdomen with a yellow band on the anterior half of the second segment.

Face black, shining, with a grey tomentose stripe just below the antennæ and an obscure yellowish spot where the usual stripe begins; a line of grey tomentum divides the cheeks from the upper part of the face; forehead with the usual black tubercles, which are large, a narrow band of grey tomentum divides them. Antennæ rather long, yellow, the second and third joints darker; the first two joints pubescent, the third bare. Palpi yellow. Thorax black and shining, with traces of a broad grey stripe, some white pubescence on the dorsum and on the posterior border, and yellow hairs at the sides. Scutellum black. Abdomen black, with some white pubescence, with a yellow band on the anterior half of the first two segments; that on the second is widest and concave in the middle, becoming broader at the sides; the underside yellow at the base and black on the apex. Legs black, the anterior and middle femora and the middle and posterior tarsi yellow. Wings clear, the dark colouring hardly perceptible at the extreme base; along the fore border it is narrow and only reaches the band, the apex being quite clear; the band hardly attains the hind border and becomes paler in the fourth posterior cell, only just continuing into the fifth; in some of the specimens it does not

reach beyond the fourth and never attains the anal cell; it is straight on both its borders.

Length 8½ millim.

One of the specimens from Borneo does not measure more than 6½ millim.

[To be continued.]

LXIII.—*Relationships of the Rugosa (Tetracoralla) to the living Zoantheæ.* By J. E. Duerden *.

When briefly discussing, in 1871, the Palæozoic corals included under Milne-Edwards and Haime's order Rugosa, the late Count Pourtalès thus remarks:—"Mr. R. Ludwig has shown (H. v. Meyer's 'Palæontographica,' vols. x. and xiv.) that the tetrameral arrangement claimed for the Rugosa is only apparent, there being originally six primary septa, but that further development in each system is asymmetrical, and that two of the systems remain generally undeveloped. I had, before having knowledge of Ludwig's researches, come substantially to the same conclusions by the examination of *Lophophyllum proliferum*, Edw. & H., from the Carboniferous formation, a form very suitable for that study. . . . When the youngest stage of the coral is examined by cutting through the tip of the conical *Lophophyllum proliferum*, six primary septa and six interseptal chambers are found, placed symmetrically on two sides of a vertical plane, and unequally developed."

The very elaborate and painstaking researches of Ludwig and the above definite statement of Pourtalès have apparently never been accorded the full consideration they deserve in any discussion of the affinities of the Rugosa. Supported by the conclusions of Kunth (1869), it seems to have been generally accepted by most students of this extinct group of corals that the adult arrangement of the septa around four principal members is sufficient evidence for assuming a primary tetrameral plan. The procedure is in some measure to be accounted for by the rarity with which the earlier stages in the growth of the septa of fossil corals are procured, and the difficulties involved in their investigation.

Tetramerism, both primary and secondary, has been the conception underlying most of the recent attempts which have

* From the 'Johns Hopkins University Circulars,' vol. xxi. No. 155, pp. 19–25 (Jan. 1902).